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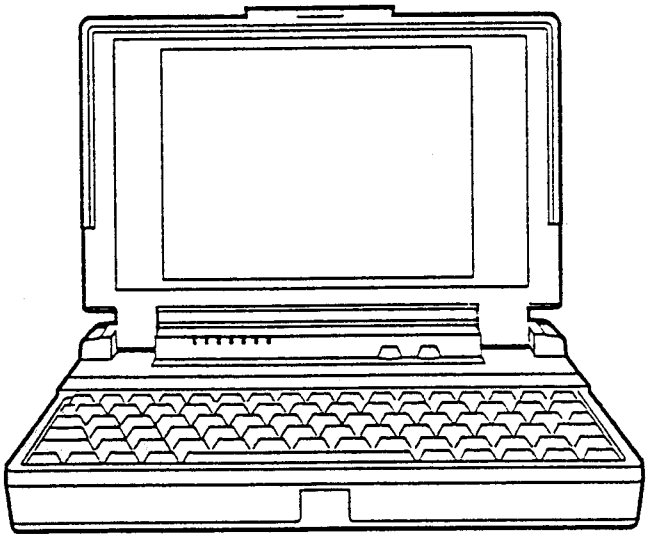

MastersPort 286/386SX

Service Manual

860-259 585-0357

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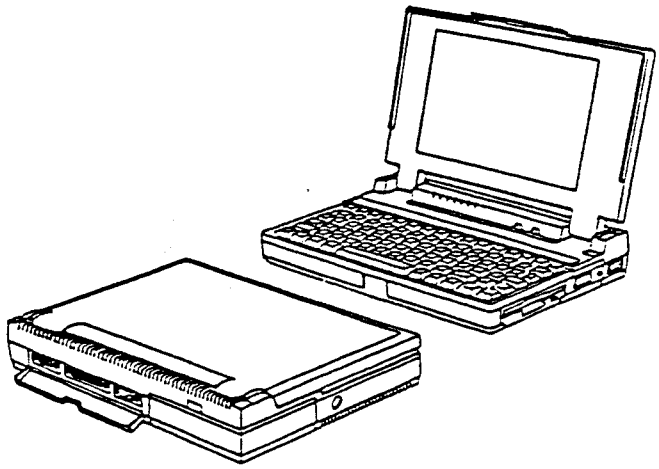
Chapter 1

Introduction

The MastersPort is an AT-compatible, laptop computer with VGA display capabilities and an 80286 or 80386SX processor, depending on the computer model.

Figure 1-1. *MastersPort Laptop Computer*



Related Publications

- MastersPort 286 Owner's Manual (part number 595-5030)
- MastersPort 386SX Owner's Manual (part number 595-5029)
- Disk-Based Diagnostics Manual (Model CB-31-12)

Tools

Use the following tools when servicing the MastersPort computers:

- #1 Phillips screwdriver
- #0 Phillips screwdriver
- PLCC IC remover

Safety Precautions

To avoid shock or personal injury when servicing this computer:

- Use a grounded AC power source when operating the computer
- Disconnect all power before opening the cabinet
- Avoid power-to-ground shorts.

Base Computer

The computer consists of the following major assemblies:

- System board
- I/O board
- LED board
- LCD display
- Floppy and hard disk drives
- DC-to-DC power supply
- Keyboard.

System Board

The system board contains the following:

- CPU
- Memory controller
- 1M (MastersPort 286) or 2M (MastersPort 386SX) RAM
- Memory expansion socket
- Coprocessor socket
- DMA controller
- Interrupt controller
- Real-time clock
- Suspend/resume support.

I/O Board

The I/O board contains the following:

- Keyboard controller/interface
- Floppy and hard disk drive interface
- Video controllers/LCD display interface
- Parallel and serial port controllers and interface.

LED Board

The LED board provides the following indicators:

- POWER STATE
- SUSPEND
- HDD/FDD
- PAD LOCK
- NUM LOCK
- CAPS LOCK
- SCROLL LOCK

LCD Display

The LCD display is a transparent negative black and white display using a cold cathode backlight to improve viewing. The display provides VGA-quality resolution of 640 x 480 pixels with 16 shades of grey. The display contains all driver circuits and interfaces with the system board and LED board.

Disk Drives

The computer contains one 1.4M 3.5-inch floppy disk drive and either a 30M (MastersPort 286) or a 60M (MastersPort 386SX) hard disk drive.

DC-to-DC Power Supply

The internal DC-to-DC power supply modifies the +6 VDC to +11 VDC input voltage to provide the following outputs:

- +5 VDC at 3.75 A, 4.6 A surge, ripple 50 mV p-p
- +12 VDC at .1 A, .2 A surge, ripple 100 mV p-p
- -26 VDC at .04 A, ripple 200 mV p-p
- 1000 VAC, open-load
- 350 VAC, 5 mA (lamp strike).

Keyboard

The computer comes with an 81-key keyboard. The keyboard emulates the functions of a standard 101-key keyboard.

Optional Hardware

The following hardware options are available for the MastersPort computers:

- 1M expansion module (MastersPort 286)
- 2M expansion module (MastersPort 386SX)
- 300/1200/2400 bps modem
- Fast-recharge NiCad battery pack
- AC adapter.

Chapter 2

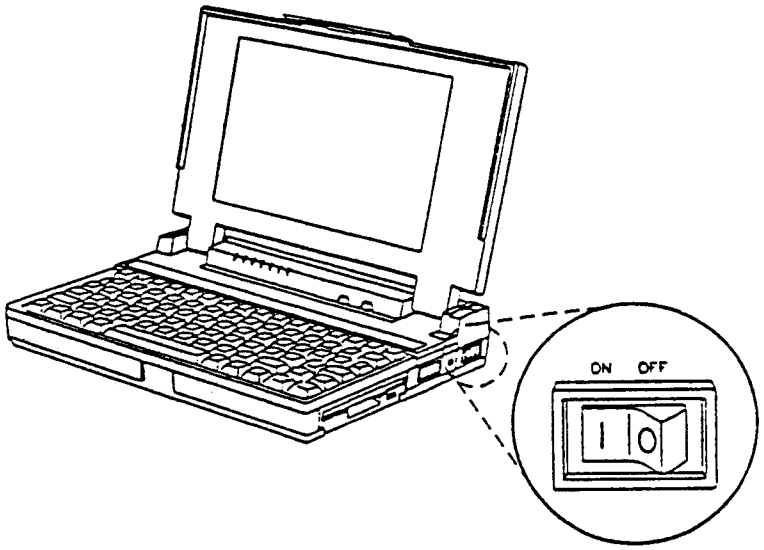
Operation

This chapter discusses powering up and resetting the computer. Refer to the computer owner's manual for information on the configuration and setup of the computer.

Power-up

Turn on the computer using the power switch, as shown in Figure 2-1.

Figure 2-1. Power Switch



When power is applied (under the default configuration):

- The keyboard is reset (status LEDs blink)
- The power state LED blinks and remains on
- The LCD panel blinks and comes on
- The hard disk drive powers up
- The keyboard resets a second time
- The floppy disk drive LED lights
- The hard disk drive LED lights
- The computer attempts to boot the operating system from the device determined by Setup.

If the operating system is not installed on the disk, one of the following messages appears:

```
Non-system disk or disk read error

Non-DOS disk error reading drive x:
```

These messages are normal and indicate the absence of an operating system.

If the computer detects faults during the power-up sequence, an error message may appear on the display. (If the display is not readable, adjust the BRIGHTNESS and CONTRAST controls). Refer to the Troubleshooting chapter for explanations of error messages.

Resetting the Computer

Reset the computer in either of the following ways:

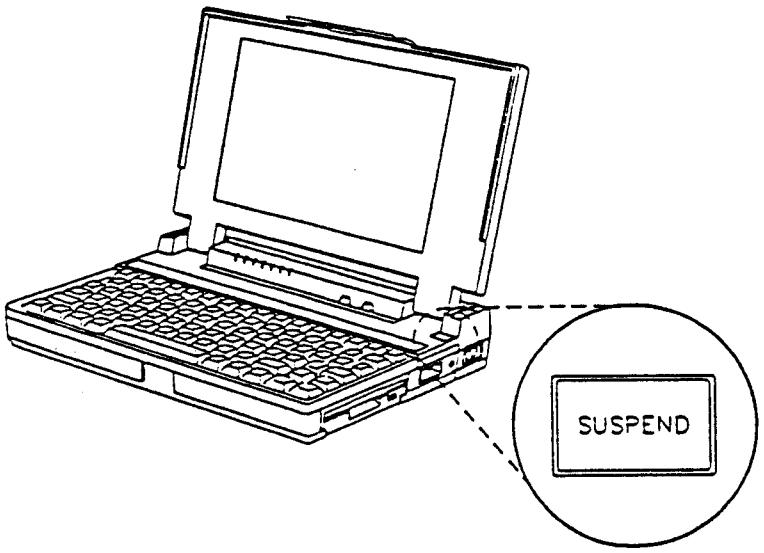
1. Press and hold the CTRL, ALT, and DEL keys, and then release them. This reinitializes the computer and begins the autoboot sequence.

2. Turn off the computer, wait 15 seconds, and then turn it back on. All circuits are reset to the power-on state.

Suspend/Resume

To use the suspend mode, press the button marked SUSPEND located above the keyboard on the right side of the computer (refer to Figure 2-2). Hold the button until the computer beeps once.

Figure 2-2. Suspend Button



This shuts down everything except the memory. To continue using the computer, press the SUSPEND button again and the computer will resume program operation.

Note: The suspend mode will not resume properly with certain protected mode software.

Chapter 3

Troubleshooting

This chapter provides troubleshooting procedures for the computer and includes a list of error messages. Enough information is provided to diagnose most faults to the major assembly level.

Preliminary Checks

Before you begin troubleshooting, perform the following:

- Before powering-up the computer, look for signs of damage.
- Verify the AC adapter is operational. Refer to the pinout in the Specifications section.
- Refer to the owner's mannal and, if possible, verify that the computer is properly configured in the Setup program.

Before replacing any major assemblies, refer to the Disassembly and Installation of Options chapter and remove the keyboard and LCD display assembly. Inspect the inside of the computer for damage to the circuit boards or the chassis parts, including:

- Dented or bent metal parts
- Frayed, nicked, or cut cables
- Visible cracks on circuit boards
- Heat damage (discoloration or melting)
- Crushed or broken secket connectors

Check all boards and cables for proper connection. Remove any optional boards that are not part of the bese computer configuration.

Status LEDs

Figure 3-1 illustrates the power status LED below the LCD panel. Table 3-1 defines the three states of this LED.

Figure 3-1. Power Status LED

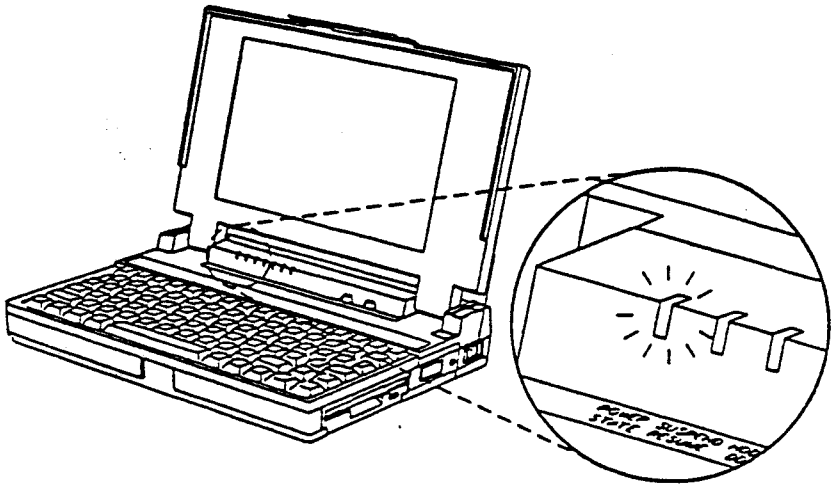


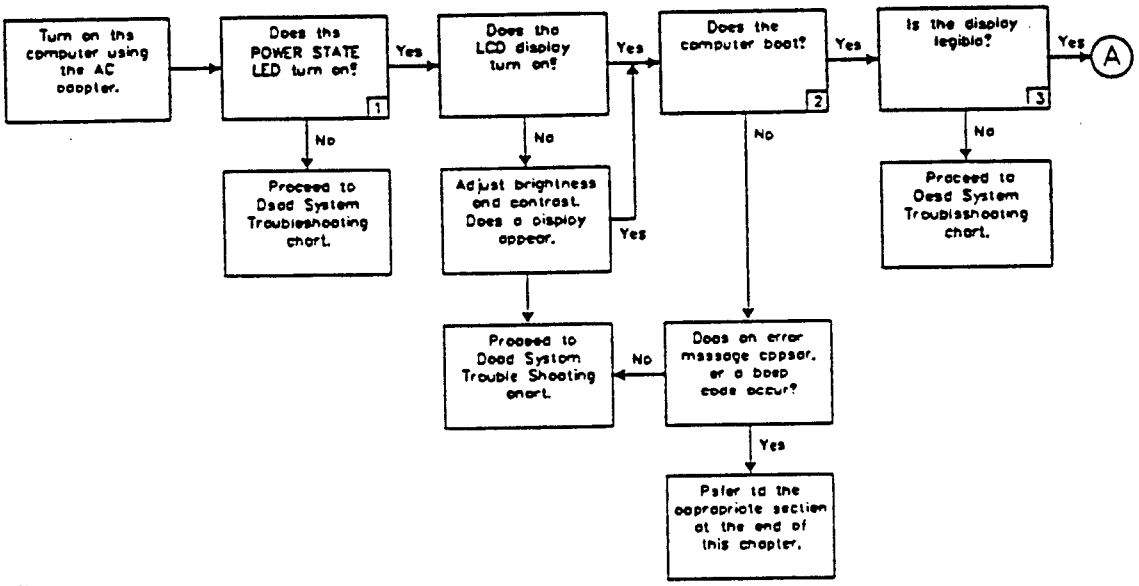
Table 3-1. Power Status LED Definitions

STATE	DEFINITION
Green	Operating on AC or battery power
Amber (flashing)	Discharged battery
Amber (steady)	Fully discharged battery

Troubleshooting Charts

The following charts are organized to simplify troubleshooting. Start with the general system troubleshooting chart. This chart provides immediate repair recommendations or directs you to another chart.

Figure 3-2. General System Troubleshooting Chart



Notes:

1. POWER STATE LED should be green.
2. The computer will attempt to boot the floppy, then hard disk drive.
3. The operating system prompt should be clear and visible.

Figure 3-2. General System Troubleshooting Chart (continued)

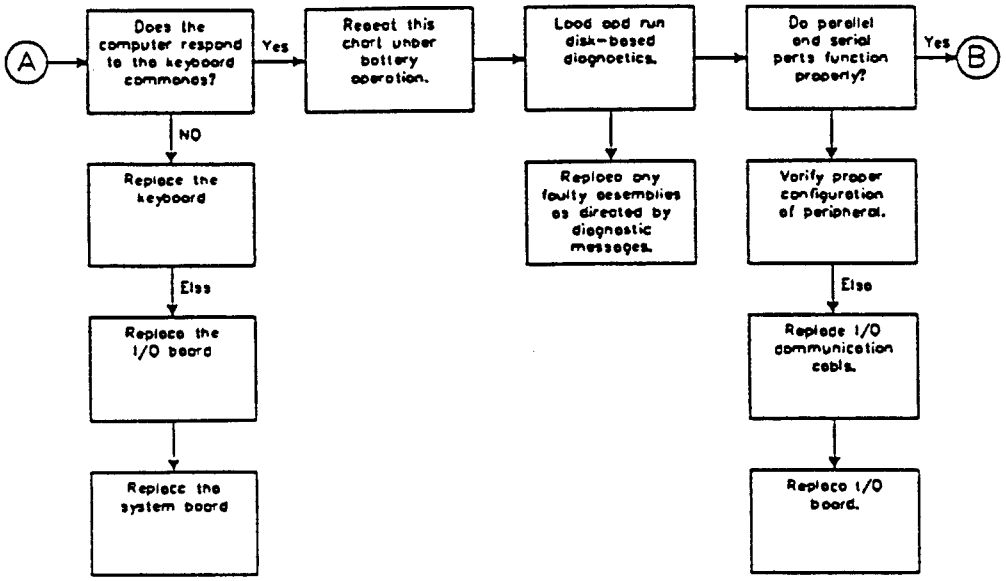
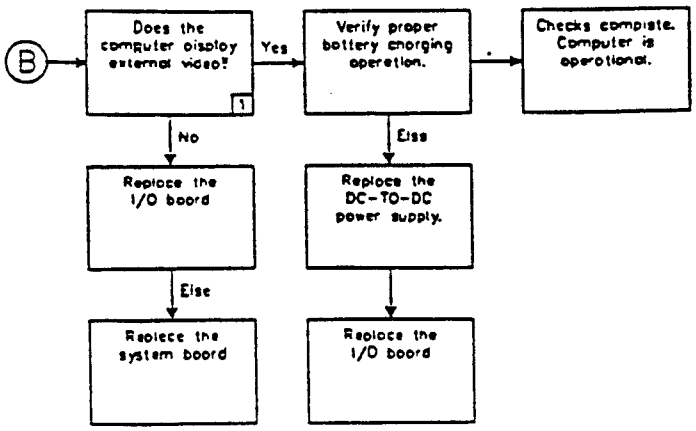
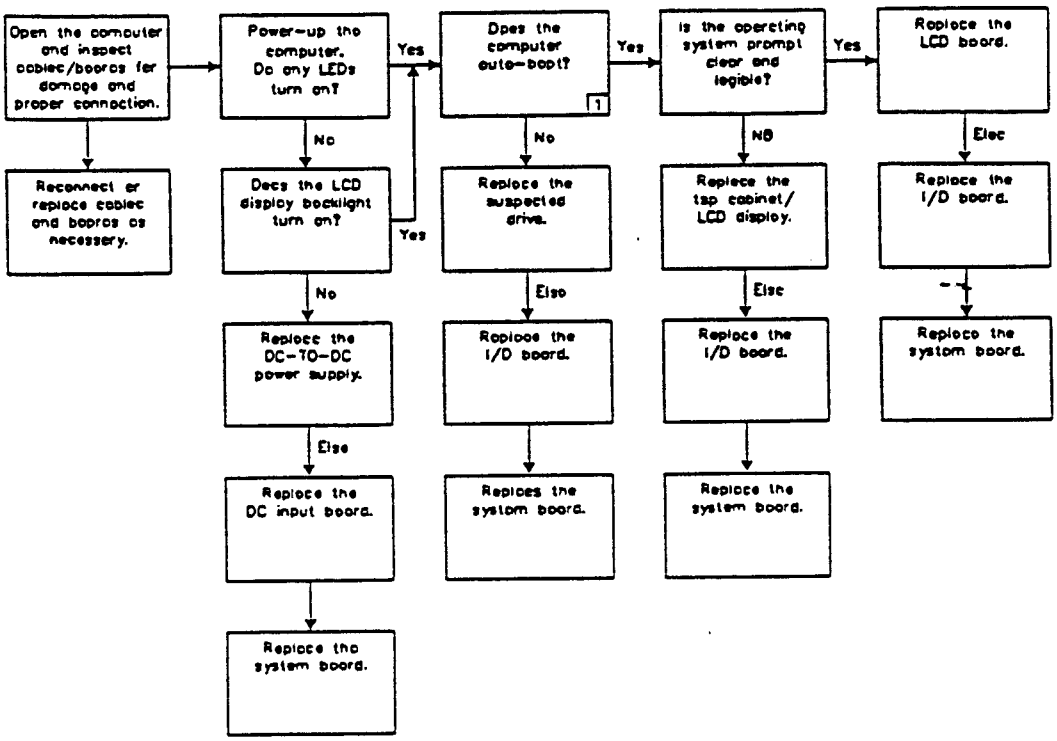


Figure 3-2. General System Troubleshooting Chart (continued)



Note:
Use the Fn-F2 key sequence to switch to external CRT operation.

Figure 3-3. Dead System Troubleshooting Chart



Note:
The computer will attempt to boot the floppy, then hard disk drive.

Disk-Based Diagnostics

Optional disk-based diagnostics are available for this computer. The diagnostics are user-configurable and allow more extensive testing of the computer.

Error Messages

This section lists the error messagas that the computer can display, a probable cause of the message, and a recommended solution to correct the error.

Clock chip lost power (hit any key to eontinue)

Cause: The real-time clock is not working.

Solutiou: Run the SETUP utility and check all configuration settings.

CMOS checksum invalid (hit any key to continue)

Cause: There is a configuration error.

Solution: Run the SETUP utility and check all configuration settings.

Incorrect configuratiou data in CMOS (hit any key to continue)

Cause: Configuration data entered in the SETUP utility does not match the system hardware.

Solution: Run the SETUP utility. Make sure all settings are correct. If the error persists, replace the system board.

System Beep Codes

Sometimes system errors cannot be reported visually. Whan an error occurs before the screen is initialized or when the computer is set to loop on the system board tests, the computer issues a beep code. For example, "1-2-3" means one beep, then two beeps, and then three beeps. Table 3-2 defines the fatal system beep codes, including probable cause.

Table 3-2. Fatal System Beep Codes

BEEP CODE	PORT 80H	DESCRIPTION
NONE	01H	CPU register test in progress
1-1-3	02H	CMOS write/read failure
1-1-4	03H	ROM BIOS checksum failure
1-2-1	04H	Programmable interval timer failure
1-2-2	05H	DMA initialization failure
1-2-3	06H	DMA page register write/read failure
1-3-1	08H	RAM refresh verification failure
NONE	09H	First 64K RAM test in progress
1-3-3	0AH	First 64K RAM chip or data line failure multi-bit
1-3-4	0BH	First 64K RAM odd/even logic failure
1-4-1	0CH	Address line failure first 64K RAM
1-4-2	0DH	Parity failure first 64K RAM
2-1-1	10H	Bit 0 first 64K RAM failure
2-1-2	11H	Bit 1 first 64K RAM failure
2-1-3	12H	Bit 2 first 64K RAM failure
2-1-4	13H	Bit 3 first 64K RAM failure
2-2-1	14H	Bit 4 first 64K RAM failure
2-2-2	15H	Bit 5 first 64K RAM failure
2-2-3	16H	Bit 6 first 64K RAM failure
2-2-4	17H	Bit 7 first 64K RAM failure
2-3-1	18H	Bit 8 first 64K RAM failure
2-3-2	19H	Bit 9 first 64K RAM failure
2-3-3	1AH	Bit 10 first 64K RAM failure
2-3-4	1BH	Bit 11 first 64K RAM failure
2-4-1	1CH	Bit 12 first 64K RAM failure
2-4-2	1DH	Bit 13 first 64K RAM failure
2-4-3	1EH	Bit 14 first 64K RAM failure
2-4-4	1FH	Bit 15 first 64K RAM failure
3-1-1	20H	Slave DMA register failure
3-1-2	21H	Master DMA register failure
3-1-3	22H	Master interrupt mask register failure
3-1-4	23H	Slave interrupt mask register failure
NONE	23H	Interrupt vector loading in progress
3-2-4	27H	Keyboard controller test failure
NONE	28H	CMOS power failure and checksum calculation in progress
NONE	29H	CMOS configuration validation in progress
3-3-4	2BH	Screen memory test failure
3-4-1	2CH	Screen initialization failure
3-4-2	2DH	Screen retrace test failure
NONE	2EH	Search for video ROM in progress
NONE	30H	Screen running with video ROM
NONE	31H	Monochrome monitor operable
NONE	32H	Color monitor (40 column) operable
NONE	33H	Color monitor (80 column) operable

Table 3-3 defines the non-fatal beep codes, including probable cause.

Table 3-3. *Non-Fatal System Beep Codes*

BEEP CODE	PORT 80H	
4-2-1	34H	Timer tick interrupt test in progress or failure
4-2-2	35H	Shutdown test in progress or failure
4-2-3	36H	Gata A20 failure
4-2-4	37H	Unexpected interrupt in protected mode
4-3-1	38H	RAM test in progress or address failure >> FFFFh
4-3-3	3AH	Interval timer channel 2 test or failure
4-3-4	3BH	Time-of-day clock test in progress
4-4-1	3CH	Serial port test or failure
4-4-2	3DH	Parallel port test or failure
4-4-3	3EH	Math coprocessor test or failure

Chapter 4

Disassembly and Installation of Options

This chapter contains step-by-step instructions for disassembly and for the installation of options.

Static Precautions

When handling circuit boards or integrated circuits (ICs):

- Do not remove any static-sensitive device from its protective packaging until you are ready to install it.
- Equalize the static electricity between the work surface, the device, and yourself by touching the work surface with one hand and then picking up the device with the other hand.
- After removing the device from its protective packaging, do not set it down or let go of it until it is installed in the computer or returned to its protective packaging.

Connector Contact Lubrication/Treatment

To inhibit fretting of connectors, use a protective lubricant whenever you replace certain boards in the computer. Apply this lubricant to the connectors indicated in the disassembly procedures. This lubricant is available in the following packages:

- 4 oz. fluid — Part number 969-2065-01
- 1 cc. gel — Part number 352-0043-00

Disassembly

Note the orientation and placement of any cables and shielding you remove when you disassemble the computer. To reassemble the computer, reverse the order of the disassembly procedure, unless instructed otherwise.

Caution: Avoid shock hazard. Before disassembling or installing any optional hardware into the computer:

- Make sure the power switch is OFF.
- Unplug the computer and disconnect the power cord from the external power supply.
- Remove the battery pack.

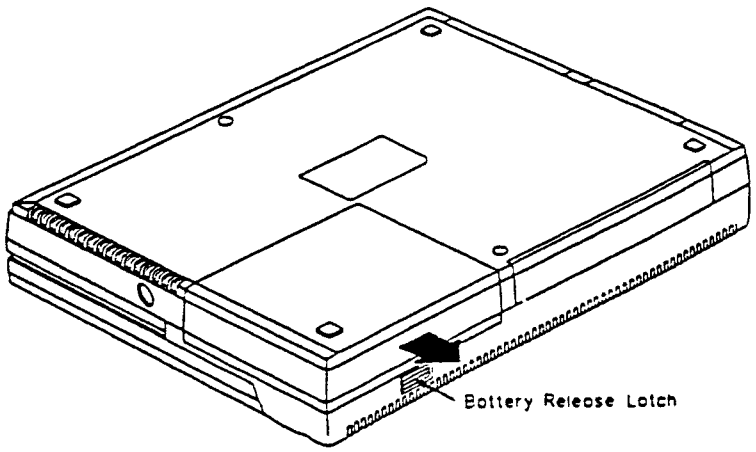
Disconnect and remove all external cables, including those connected to telephones, telephone lines, and peripherals.

Turn on the computer and run the MS-DOS ship utility, or its equivalent, before disassembly. Place a shipping insert (or a scratch disk) in the floppy drive. Place the computer top down on a soft cloth.

Battery Pack

To remove the battery pack from the bottom of the computer, press the release latch end slide the battery pack free. Refer to Figure 4-1.

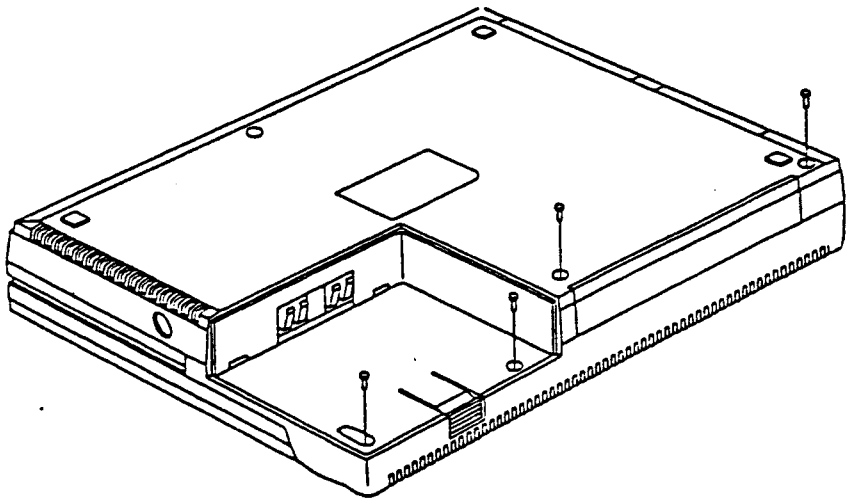
Figure 4-1. Removing the Battery Pack



Top Subassembly

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the four screws from the bottom of the computer, as shown in Figure 4-9.

Figure 4-9. Removing the Bottom Screws

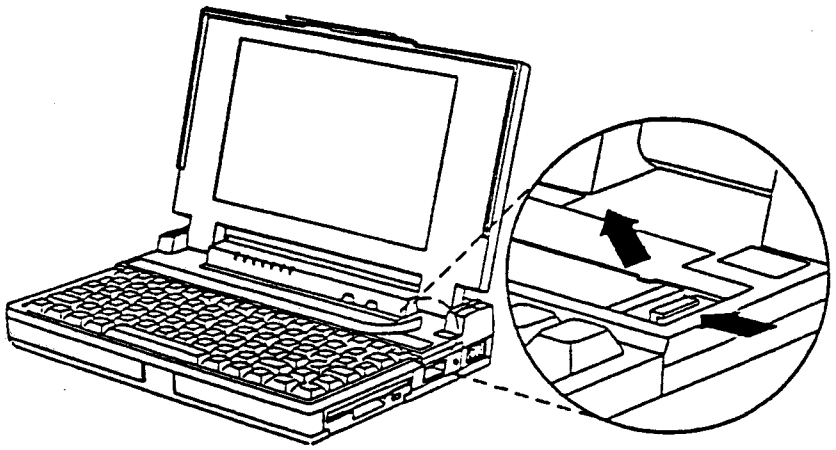


Numeric Coprocessor Installation

1. Remove the function key template by lifting up one edge and sliding it free of the computer.

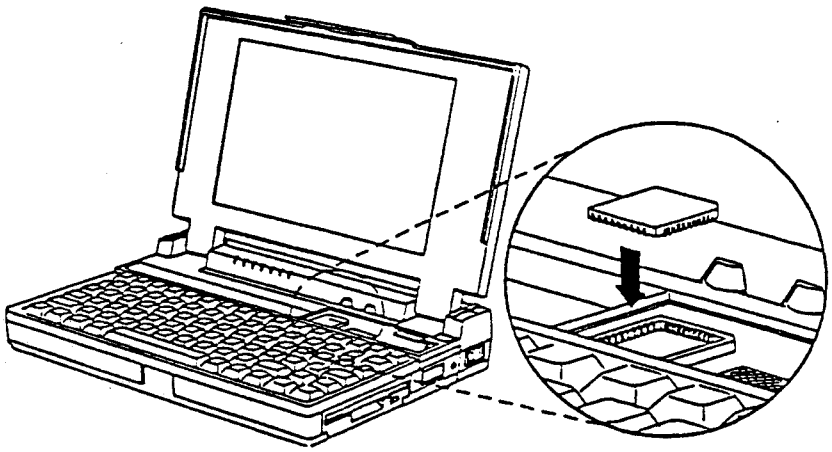
2. Using a small, flat-bladed screwdriver, remove the internal option access panel as shown in Figure 4-2.

Figure 4-2. *Option Access Panel Removal*



3. Position the numeric coprocessor above its socket, as shown Figure 4-3. Make sure the notched corner of the numeric coprocessor and the notched corner of its socket are lined up.

Figure 4-3. *Installing the Numeric Coprocessor*



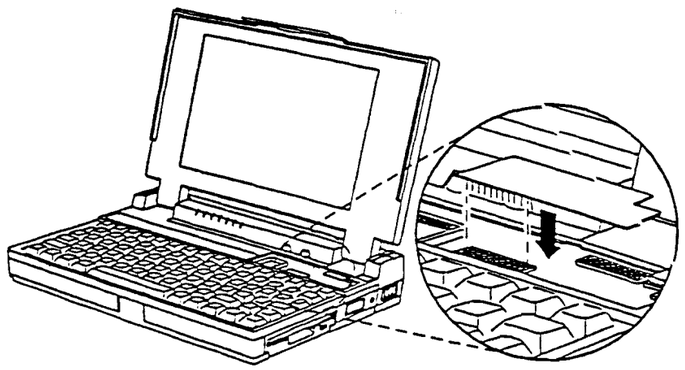
4. Press the numeric coprocessor into the socket.

5. Replace the access panel and the function key template.

Memory Expansion Module Installation

1. Remove the function key template by lifting up one edge and sliding it free of the computer.
2. Using a small, flat-bladed screwdriver, remove the internal option access panel as shown in Figure 4-2.
3. Position the memory expansion module above its socket, as shown in Figure 4-4.

Figure 4-4. *Installing the Memory Module*

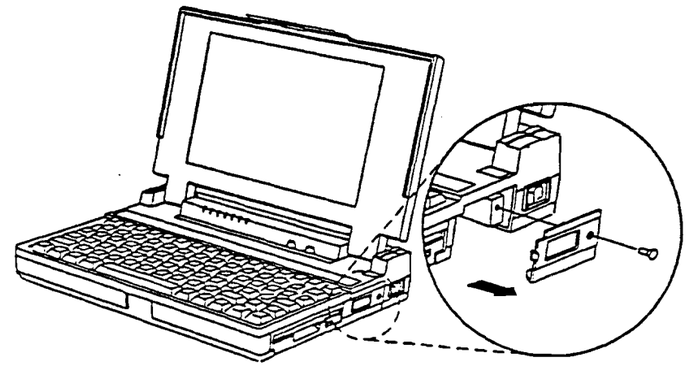


4. Press the memory expansion module into the socket. Be careful not to crush any legs on the module.
5. Replace the access panel and the function key template.
6. Refer to the Setup chapter in the owner's manual and configure the computer for the new memory.
7. Run the disk-based diagnostics to ensure the new memory is operating properly.

Modem Installation

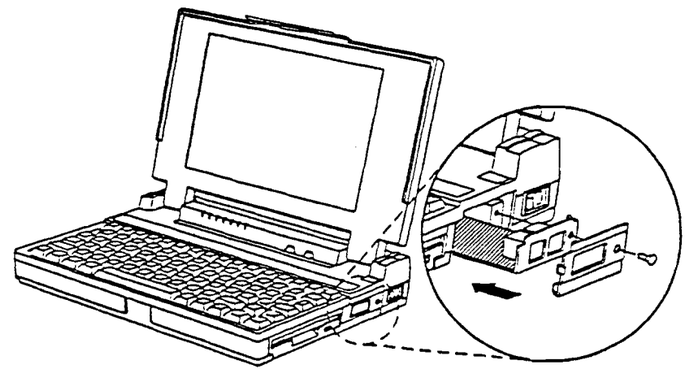
1. Remove the screw and modem cover as shown in Figure 4-5.

Figure 4-5. *Modem Cover Removal*



2. Remove the blocking plug from the modem cover by pressing it in.
3. Slide the modem into the computer as shown in Figure 4-6. Make sure it is seated properly.

Figure 4-6. *Modem Installation*

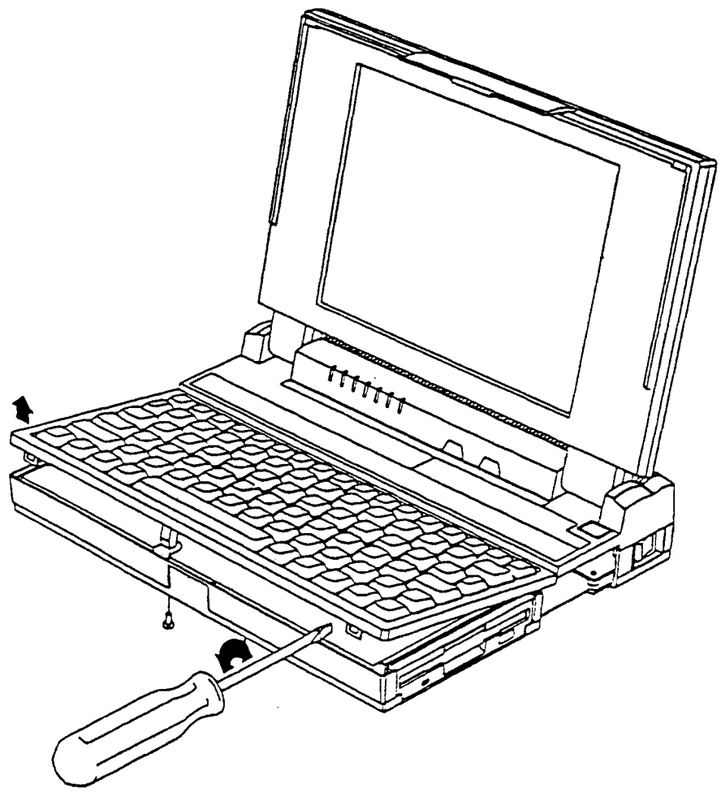


4. Replace the modem cover.
5. Refer to the Setup chapter in the owner's manual to configure the modem.

Keyboard

1. Remove and save the screw from the bottom of the computer, as shown in Figure 4-7.

Figure 4-7. Keyboard Removal



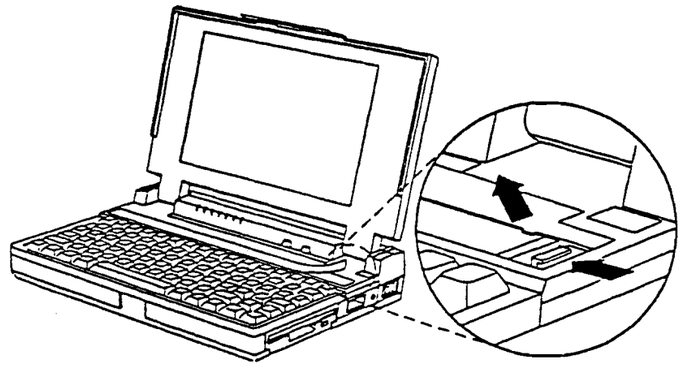
2. Using a small flat-bladed screwdriver, release the lock tabs on each side of the keyboard.

Numeric Coprocessor Installation

1. Remove the function key template by lifting up one edge and sliding it free of the computer.

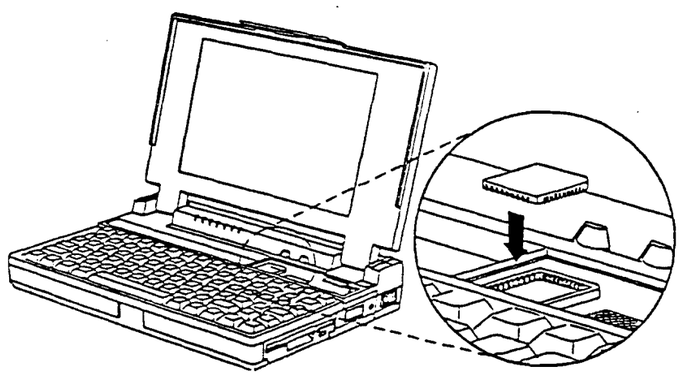
2. Using a small, flat-bladed screwdriver, remove the internal option access panel as shown in Figure 4-2.

Figure 4-2. Option Access Panel Removal



3. Position the numeric coprocessor above its socket, as shown Figure 4-3. Make sure the notched corner of the numeric coprocessor and the notched corner of its socket are lined up.

Figure 4-3. Installing the Numeric Coprocessor

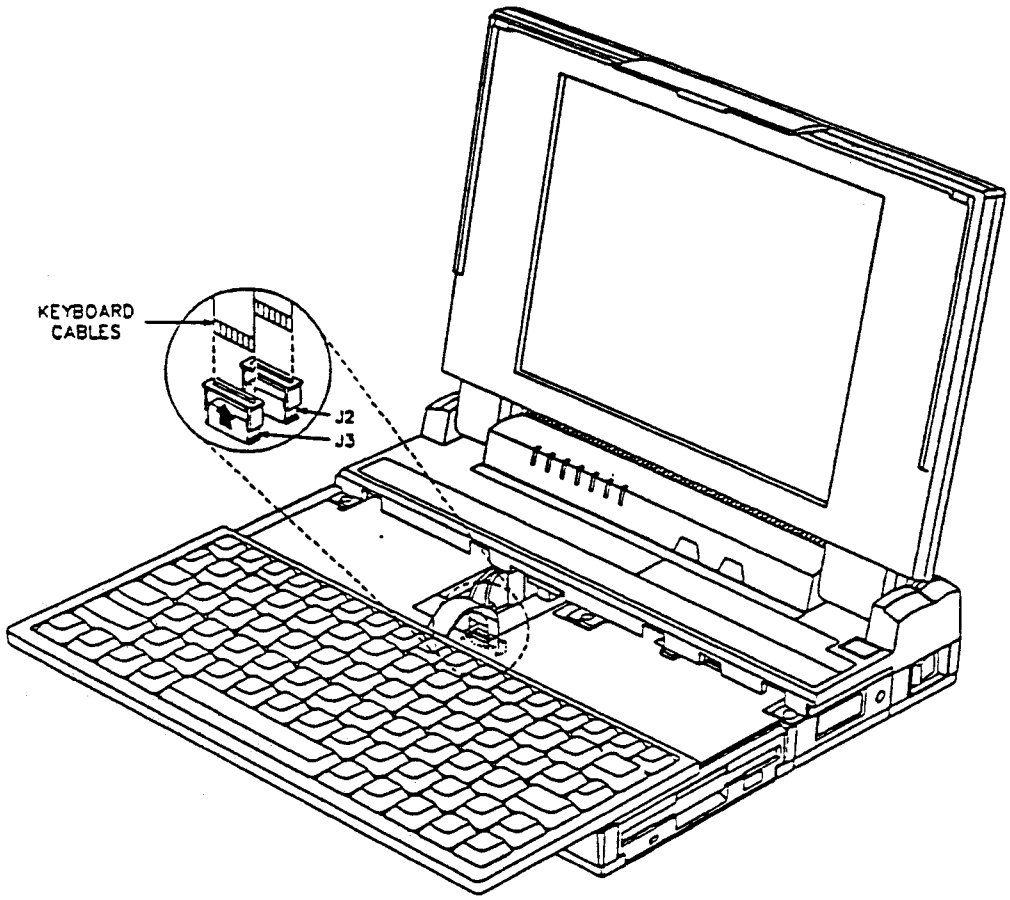


4. Press the numeric coprocessor into the socket.

5. Replace the access panel and the function key template.

3. Disconnect the keyboard cables from J2 and J3 on the I/O board, as shown in Figure 4-8.

Figure 4-8. *Disconnecting the Keyboard Cables*

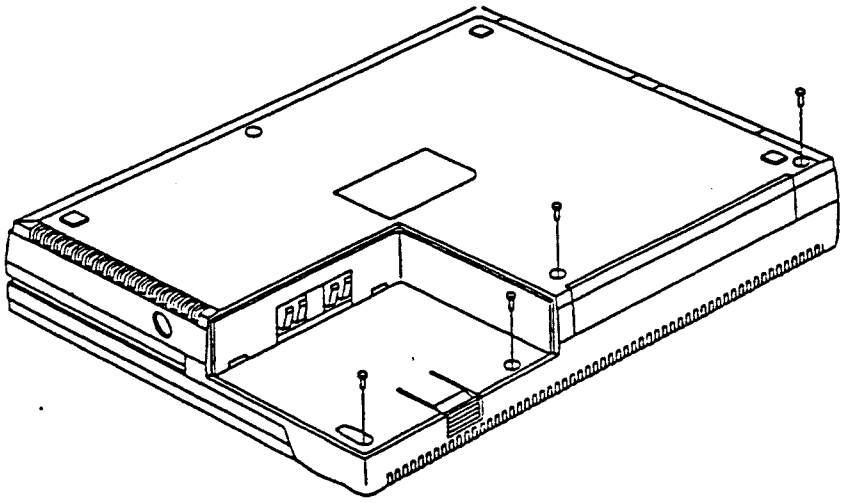


4. Remove the keyboard.

Top Subassembly

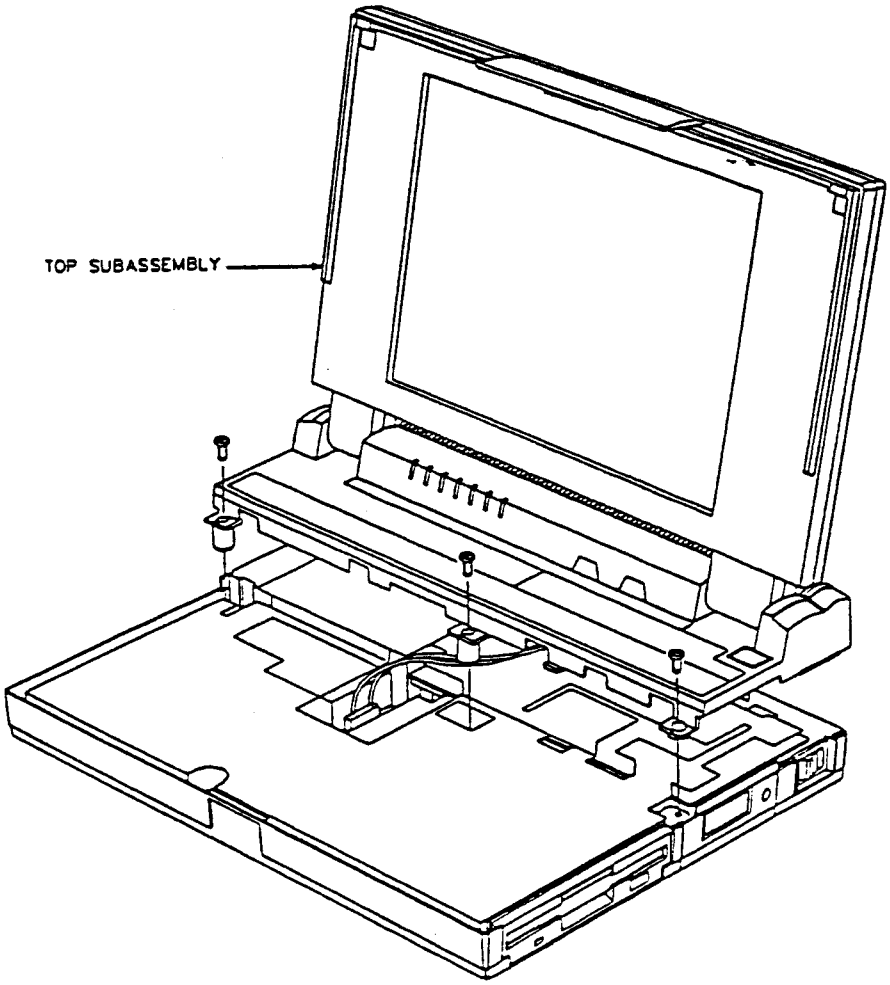
1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the four screws from the bottom of the computer, as shown in Figure 4-9.

Figure 4-9. Removing the Bottom Screws



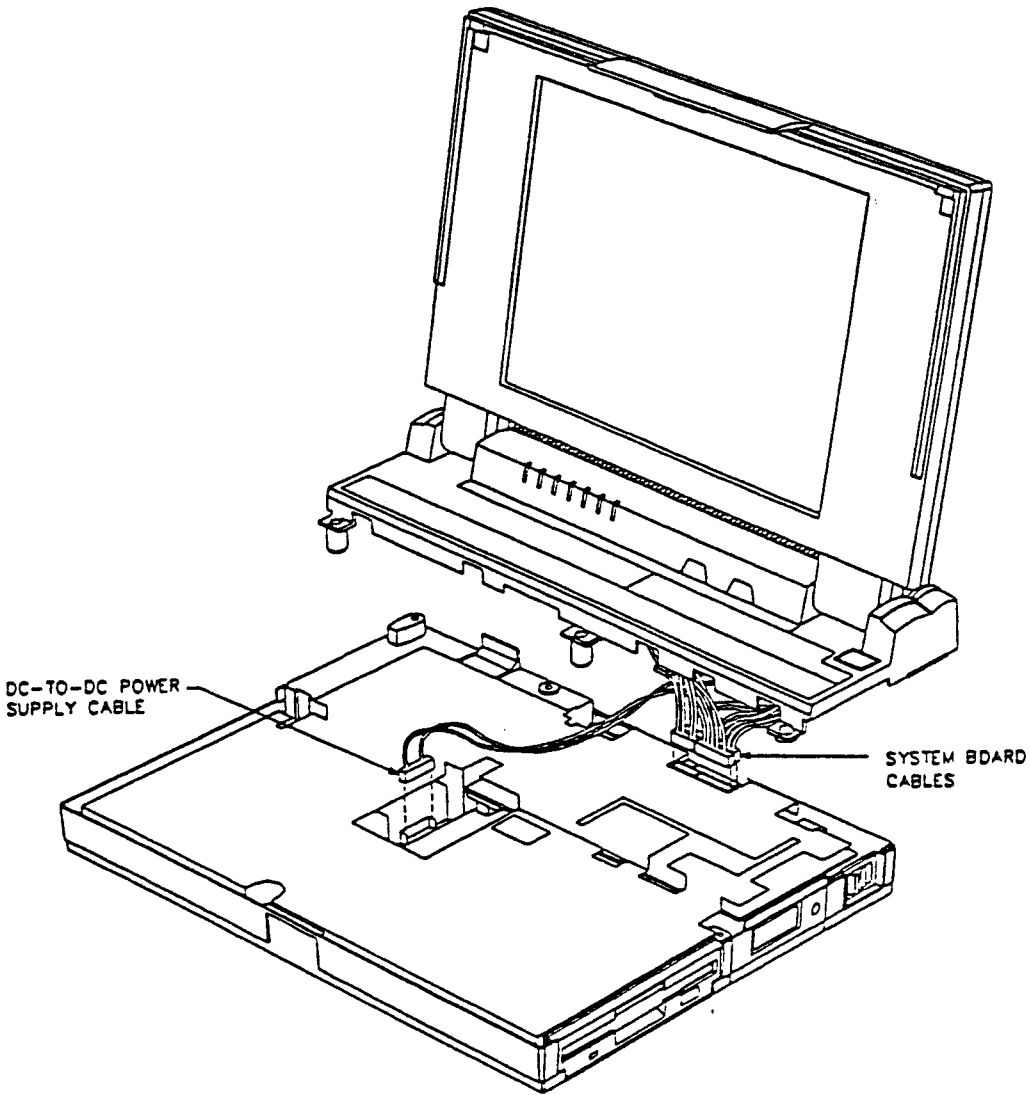
4. Remove the three screws that secure the top subassembly, as shown in Figure 4-10.

Figure 4-10. Removing the Top Subassembly



5. Disconnect the cable from the DC-to-DC power supply, and disconnect the four cables from the system board, as shown in Figure 4-11.

Figure 4-11. Cable Disconnection



6. Remove the top subassembly.

Note: If you are replacing the top cabinet/LCD display, remove and save the original function key template, options access door, and LED board.

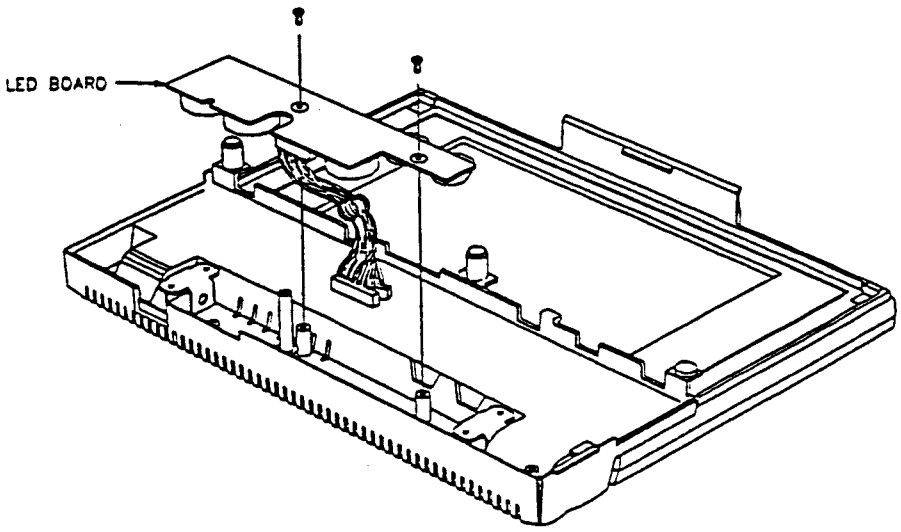
7. Apply protective lubricant to the LCD cable connections (J4 and J5) and to the LED cable connections (J3 and J6) on the system board before reassembling the computer.

8. Reconfigure the computer using the Setup utility after reassembly.

LED Board

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the top subassembly as previously described.
4. Remove the two screws that secure the LED board to the top subassembly, as shown in Figure 4-12.

Figure 4-12. LED Board Removal

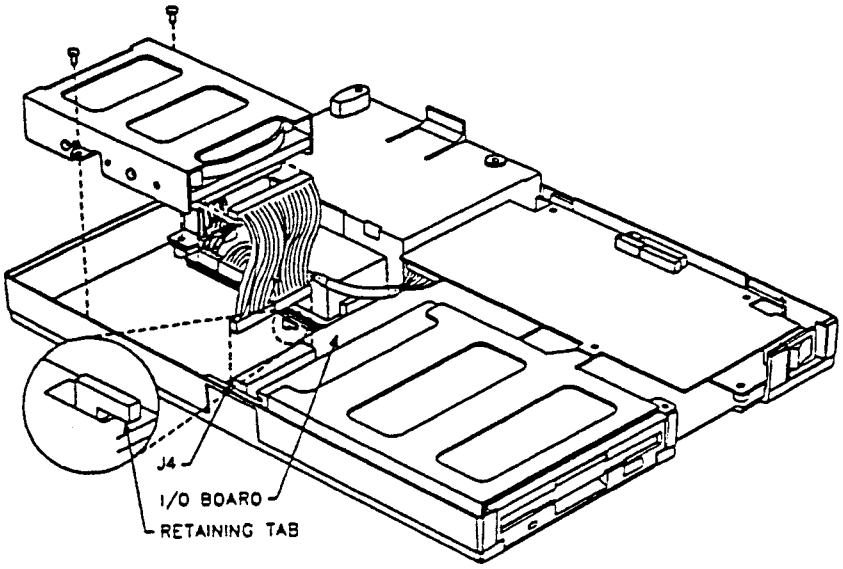


5. Remove the LED board.
6. Apply protective lubricant to the LCD cable connections (J4 and J5) and to the LED cable connections (J3 and J6) on the system board before reassembling the computer.
7. Reconfigure the computer using the Setup utility after reassembly.

Hard Disk Drive

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the top subassembly as previously described.
4. Remove the two screws that secure the hard disk drive and bracket to the bottom cover, as shown in Figure 4-13.

Figure 4-13. Hard Disk Drive Removal

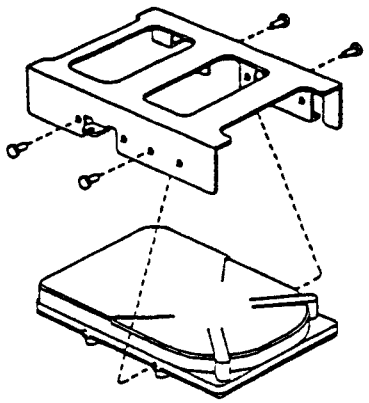


5. Carefully slide the hard disk drive to the right to free it from the retaining tab.

6. Disconnect the hard disk drive cable from J4 on the I/O board and remove the hard disk drive.

7. Remove the four screws that secure the mounting bracket to the hard disk drive, as shown in Figure 4-14.

Figure 4-14. Hard Disk Drive Bracket Removal

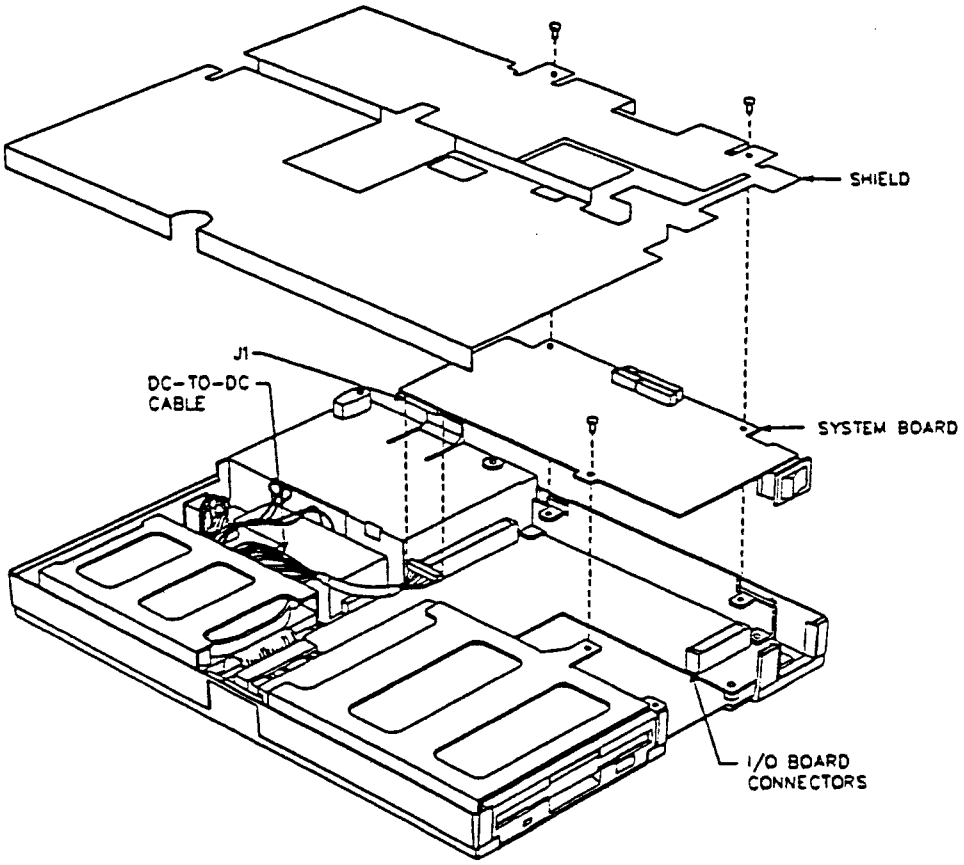


8. Reconfigure the computer using the Setup utility after reassembly.

System Board

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the top subassembly as previously described.
4. Remove the two screws and shield.
5. Remove the screw that secures the system board, as shown in Figure 4-15.

Figure 4-15. *System Board Removal*

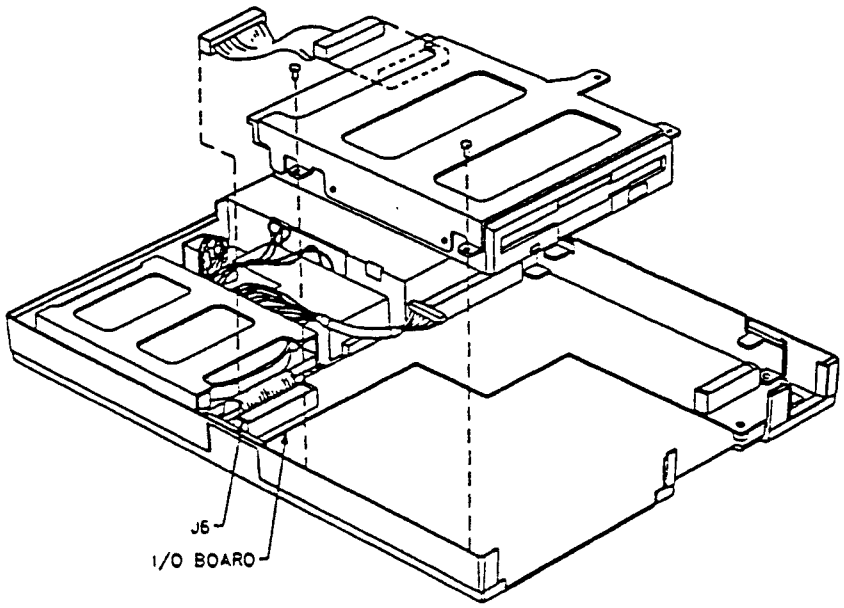


6. Disconnect the DC-to-DC cable from J1 on the system board.
7. Lift the system board up and free from the two I/O board connectors.
8. Apply protective lubricant to the LCD cable connections (J4 and J5) and to the LED cable connections (J3 and J6) on the system board before reassembling the computer.
9. Reconfigure the computer using the Setup utility after reassembly.

Floppy Disk Drive

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the top subassembly as previously described.
4. Remove the system board as previously described.
5. Remove the two screws that secure the floppy disk drive and bracket to the bottom covar, as shown in Figure 4-16.

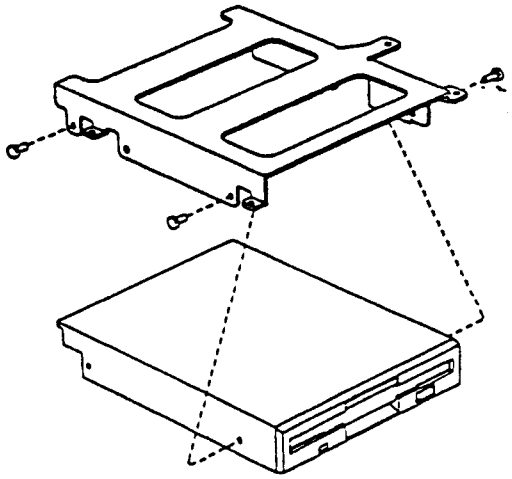
Figure 4-16. Floppy Disk Drive Removal



6. Disconnect the floppy disk drive cable from J6 on the I/O board and remove the floppy disk drive.

7. Remove the three screws that secure the monnting bracket to the floppy disk drive, as shown in Figure 4-17.

Figure 4-17. Floppy Disk Drive Bracket Removal

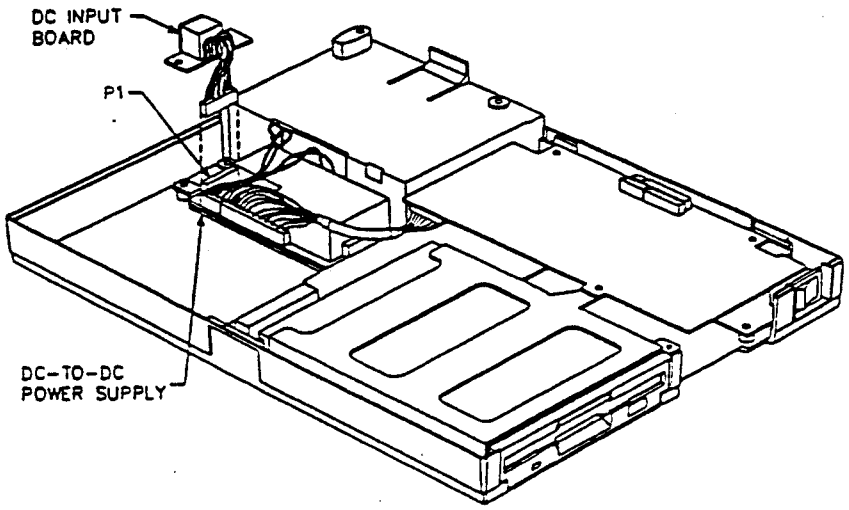


DC-to-DC Power Supply

1. Remove the hard disk drive as described earlier.

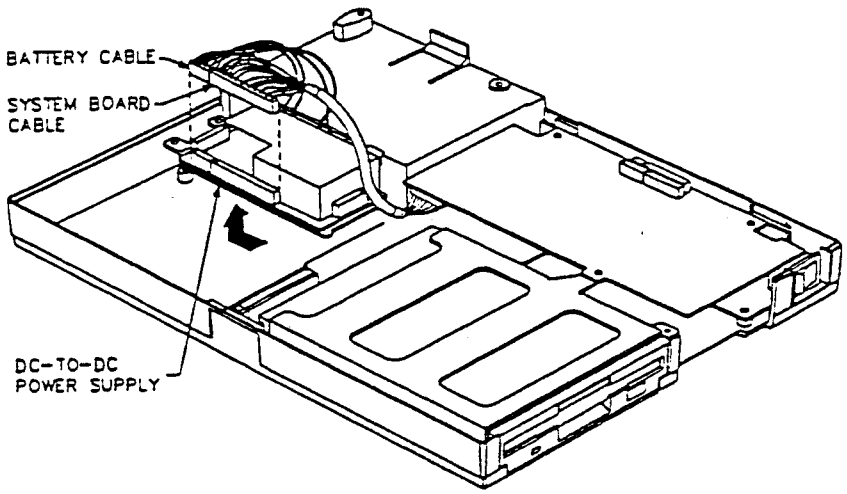
2. Disconnect the DC input boerd cable from P1 on the DC-to-DC power supply, as shown in Figure 4-18.

Figure 4-18. DC Input Board Removal



3. Disconnect the battery and system board cables from the DC-to-DC power supply, as shown in Figure 4-19.

Figure 4-19. DC-to-DC Power Supply Removal

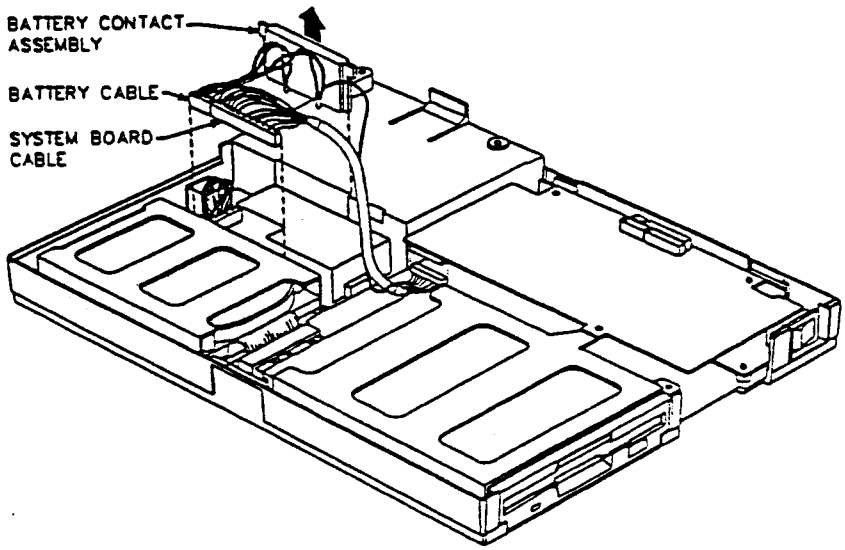


4. Remove the DC-to-DC power supply.

Battery Contact/Cable Assembly

1. Disconnect the battery and system board cables from the DC-to-DC power supply, as shown in Figure 4-20.

Figure 4-20. Battery Contact/Cable Assembly Removal

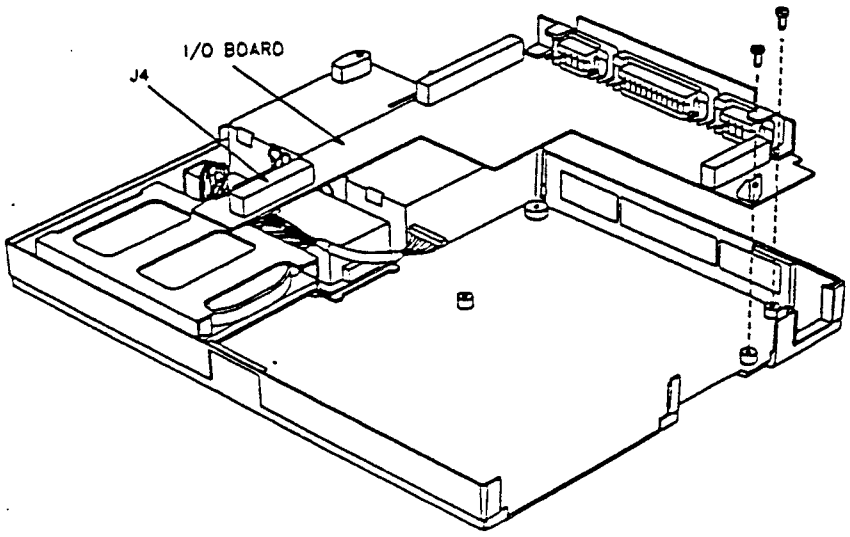


2. Remove the battery contact/cable assembly.

I/O Board

1. Remove the keyboard as previously described.
2. Remove the modem cover as described earlier.
3. Remove the top subassembly as previously described.
4. Remove the system board as previously dascribed.
5. Remove the floppy disk drive as previously described.
6. Disconnect the hard disk drive cable from J4 on the I/O board.
7. Refer to Figure 4-21 and remove the two screws that secure the I/O board to the bottom cover.

Figure 4-21. I/O Board Removal



8. Remove the I/O board.
9. Apply protective lubricant to the LCD cable connections (J4 and J5) and to the LED cable connections (J3 and J6) on the system board before reassembling the computer.
10. Reconfigure the computer using the Setup utility after reassembly.

Chapter 5

Parts List

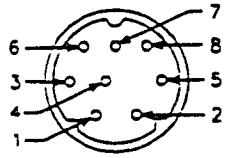
PART NUMBER	DESCRIPTION
239-98	AC adapter
239-99	NiCad battery
239-100	Cabinet, keyboard
239-102	Cover, I/O port
239-103	Cover, modem
239-186	Bottom cabinet with shield (MastersPort 3865X)
239-104	Bottom cabinet with shield (MastersPort 286)
239-181	Top cabinet with LCD display (MastessPort 386SX)
239-105	Top cabinet with LCD display (MastersPort 286)
239-80	I/O board
239-81	CPU board (MastersPort 3865X)
239-82	CPU board (MastersPort 286)
239-106	LED board
239-107	DC-to-DC power supply
239-97	Shield, large
239-83	60M HDD (MastersPort 3865X)
239-84	30M HDD (MastersPort 286)
239-190	Bracket, HDD
239-108	Cable, HDD
239-79	1.4M FDD
239-189	Bracket, FDD
239-109	Cable, FDD
239-101	Keyboard, 81-key, USA
239-183	Template, function key
239-182	Access door, accessory
239-184	Cable assy., power with battery contacts/bracket
239-187	Cable assy., brightness/contrast with bead
239-185	DC input board with cable
239-0090-OB	Keyboard U.K.
239-0090-OT	Keyboard Italia
239-0090-OD	Keyboard Germany
239-0090-OF	Keyboard France

Specifications

Power

AC Adapter

Input	90 to 265 VAC at 50 to 60 Hz.
Output	11 VDC at 35 W maximum.



PIN	SIGNAL
1	+11 VDC
2	+11 VDC
3	+11 VDC
4	0 VDC
5	0 VDC
6	+7.2 VDC
7	0 VDC
8	0 VDC

Internal DC Conversion

Input	+6 VDC to +11 VDC.
Output (DC)	+5 VDC at 3.75 A, 4.6 A surge, ripple 50 mV p-p.
	+12 VDC at 0.1 A, 0.2 A surge, ripple 100 mV p-p.
	-26 VDC at 0.04 A, ripple 200 mV p-p.
Output (AC)	1000 VAC, open load.
	350 VAC, 5 mA maximum (lamp strike).

Battery Pack

	7.2 VDC, 2800 mAh, with overcharge protection. Typical life is 500 charge/discharge cycles.
Initial Charge Time	10 to 20 hours.
Normal Recharge Time	1.5 hours.

Backup Battery	
	3.6 VDC at 50 mA NiCad. Provides backup power to real-time clock and CMOS memory.
Initial Charge Time	10 hours.
Suspend/Resume Battery	
	7.2 VDC at S0mA NiCad. Provides anough power to maintain suspand mode for 2 hours if the main battery pack is fully discharged.
Initial Charge Time	8 hours.

Processors

CPU	
MastersPort 286	Intel 80C286 microprocessor running at 12 MHz or 6 MHz. Slow mode runs at 6 MHz for compatibility and power conservation.
MastersPort 386SX	Intel 80386SX microprocessor running at 20 MHz or 10 MHz. Slow mode runs at 10 MHz for compatibility and power conservation.
Numeric Coprocessor	
MastersPort 286	Socket for optional 80C287-12 numeric coprocessor.
MastersPort 386SX	Socket for optional 80387SX-20 numeric coprocessor.

Memory

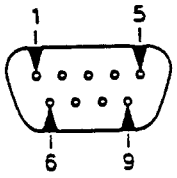
RAM	
MastersPort 286	1M standard, expandable to 2M using one 1M expansion board.
MastersPort 386SX	2M standard, expandable to 4M using one 2M expansion board.
EMS	
	64K LIM 4.0, expandable to 3M.
ROM	
	128K; stores BIOS code; functionality is transferred to RAM at power up.
CMOS	
	128 bytes in the real-time clock IC; battery-backed; used for storage of configuration data.

Input/Output

Serial

One RS-232C asynchronous, serial port; configurable as COM1 or COM2; supports baud rates of 110 – 9600; selectable protocols; 15-pin male D connector.

Serial Connector

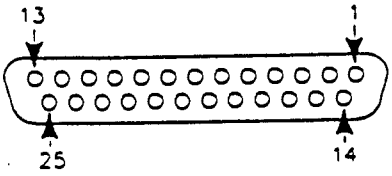


PIN	SIGNAL
1	Carrier detect (CD)
2	Receive data (RXD)
3	Transmit data (TXD)
4	Data terminal ready
5	Ground (GND)
6	Data set ready (DSR)
7	Request to send (RTS)
8	Clear to send (CTS)
9	Ring indicator (RI)

Parallel

One Centronics-type port; configured as LPT1; 25-pin female D connector.

Parallel Connector

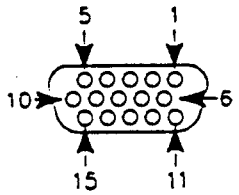


PIN	SIGNAL
1	Strobe
2-9	Data bits 0-7
10	Acknowledge
11	Busy
12	Paper out
13	Select
14	Auto feed
15	Error
16	Initialize
17	Select input
18-25	Ground

Video

Display	640 x 480 pixel black-on-white liquid crystal display with full transflective electroluminescent backlighting.
Compatibility	100% VGA register-level and BIOS-level compatible.
Video Display Memory	256K DRAM.
Horizontal Scan	15.75 kHz.
Vertical Scan	60 to 70 Hz.
Output Signal	Analog RGB, 0 to 0.714 V p-p into 75 Ω.

15-pin Video Connector



PIN	SIGNAL
1	Red video output
2	Green video output
3	Blue video output
4, 5, 12, 15	No connection
6	Red video ground
7	Green video ground
8	Blue video ground
9	No pin
10	Digital ground
11	Ground
13	Horizontal sync
14	Vertical sync

Disk Drives

Hard Disk Drive

MastersPort 286	Supports one 2.5-inch 30M IDE hard disk drive; 1:1 interleave, 25 msec access time.
MastersPort 386SX	Supports one 2.5-inch 60M IDE hard disk drive; 1:1 interleave, 25 msec access time.

Floppy Disk Drive

Supports one internal 3.5-inch, 1.44M floppy disk drive.

Keyboard

Key Layout	81 keys including alphanumeric, cursor control, numeric, and programmable function keys.
Features	Key repetition; tactile keys.
Options	Supports operating system device drivers for foreign languagas and extanded character sets.
Compatibility	101-key keyboard compatibility maintained by using mode switching and multiple keys to duplicate keypad and special function key operations.

Modem

Optional Hayes-compatible 300/1200/2400 bps modem with RJ-11 modular connector; configurable as COM1 or COM2.

Cabinet

Dimensions

Width	11.02 inches (27.99 cm).
Depth	8.6 inches (21.84 cm).
Height	2.17 inches (5.51 cm) with lid closed.

Weight

Computer	Under 5.5 lbs (2.5 kg) with battery pack.

Environmental

Temperature

Operating	50° to 95° F (10° to 35° C).
Non-operating	32° to 140° F (0° to 60° C).

Humidity

Operating	10% to 80% relative humidity (non-condensing).
Non-operating	10% to 80% relative humidity (non-condensing).

Audio

Speaker	Single channel through a miniature transducer.